(2)

The Ecomonic Foundations Of Operational Art

A Monograph
by

Major Cecil L. Lott Jr.
Aviation

School of Advanced Military Studies
United States Army Command and General Staff College
Fort Leavenworth, Kansas

Second Term AY 91–92

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED

4. TITLE AND SUBTITLE
The Economic Foundations of Operational Art

5. FUNDING NUMBERS

6. AUTHOR(S)
Major Cecil L. Lott Jr.

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
School of Advanced Military Studies
ATTN: ATZL-SWV
Fort Leavenworth, Kansas 66027-6900
COMM (913) 684-3437 Autovon 552-3437/2138

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for Public Release; Distribution Unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT (Maximum 200 words)

See Attached

14. SUBJECT TERMS			15. NUMBER OF PAGES
Operational Art	Operational Vision	Stages of Growth	45
Economic Growth	Rostow		16. PRICE CODE
Economic Development	Stages of Economic Growth		

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	Unlimited

The Ecomonic Foundations Of Operational Art

A Monograph
by

Major Cecil L. Lott Jr.
Aviation

School of Advanced Military Studies
United States Army Command and General Staff College
Fort Leavenworth, Kansas

Second Term AY 91–92

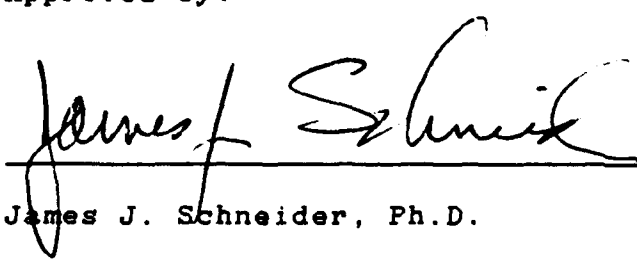
SCHOOL OF ADVANCED MILITARY STUDIES

MONOGRAPH APPROVAL

Major Cecil L. Lott Jr.

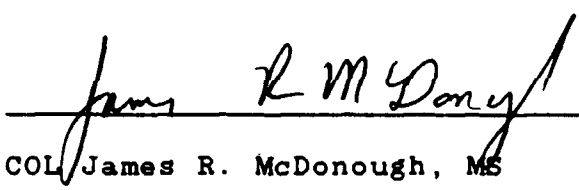
Title of Monograph: The Economic Foundations of Operational Art

Approved by:



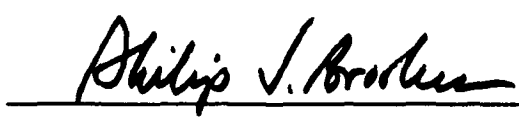
Monograph Director

James J. Schneider, Ph.D.



Director, School of

COL James R. McDonough, MS Advance Military Studies



Director, Graduate

Philip J. Brookes, Ph.D. Degree Program

Accepted this 22nd day of May 1992

ABSTRACT

THE ECONOMIC FOUNDATIONS OF OPERATIONAL ART by MAJ Cecil L. Lott Jr., USA, 45 pages.

This monograph examines the theory of operational art in light of economic growth and societal development. The study uses W.W. Rostow's five stages of economic growth as a framework for analysis and examines how operational art is manifested as different phenomenon as a society grows and develops.

The monograph provides three conclusions about operational art. First, operational art existed in the pre-Newtonian world and transforms itself over time as a society develops and grows. Second, operational vision is a key ingredient in operational art. Third, a social maturation process associated with growth and development must occur for the operational artist to use the tools of his society to practice operational art.

Finally, the monograph provides insights into the evolution of operational art. The paper suggests that operational art is in transition. The implications of the changes are not totally clear at this time. However, these changes are important because they will shape the future of Army doctrine, equipment, and the way soldiers adapt to these changes.

TABLE OF CONTENTS

I. Introduction

Alexander Hamilton once said, "Safety from external danger is the most powerful direction of national conduct; even liberty must, if necessary give way to the dictates of security because, to be more safe, men are willing to run the risk of being less free."[1] There are a number of factors that ensure the safety of a nation. Consequently, military security ranks foremost among the concerns of a nation, and military power determines whether a nation can protect itself from external danger.

Competing with military power for a nation's number one concern is economic growth and development. Economic growth and development have always been one of the concerns to governments - if only as a means of increasing the internal and external power of the state. Historically economic development has often been subordinated to other pressing concerns of the state--especially military power. However, economics also exert a direct influence on a nation's military power. Historically, it appears the more advanced economic powers of their time have been able to exercise the most influence. This is, in part, because money buys arms.

Constant and consistent economic growth is what ultimately determines the wealth of a nation. Economic

growth provides the requisite wealth a nation requires to gain mastery over its environment. With wealth, a nation can choose the ends the society will pursue. Since economics determine the ends a nation can pursue, economics is also a contributing factor in determining a nation's ability to wage war. This monograph establishes a relationship between a nation's economic growth and its use of military operational art.

II. Operational Art

Today in the Western world, a renaissance in the study of operational art is occurring. However, the question of what constitutes operational art remains a subject of debate and many different definitions of operational art exist.[2] This paper uses the following definition of operational art:

> The creative use of the tools provided by a nation that enables the operational artist (military commander) to translate his vision (mental vision) into military operations that achieve the aims (ends) of a nation specified by the nation's political leadership.[3]

A simple analogy will help to clarify this definition. In any age, the tools available to the operational artist can and will vary. A painter uses a brush, paint, and canvas to translate his vision into a work of art. The end result is a visual display, a painting, of the painter's vision. A sculptor uses

granite, a chisel, and hammer. The end result is a statue of the sculptor's vision. Finally, a composer uses music to express his vision. Here, the end result is a musical composition. The artists creating the Mona Lisa, the Venus DeMilo, and Fifth Symphony used available tools to translate their vision into art. Each artist tools, medium, vision were different, and, in each case, the final artistic creation differs. However, each represents a form of art. The same is true of operational art.

The operational artist seeks to translate his vision into military operations which will achieve established strategic aims. However, how the operational artist uses the tools available to him at any given time in history differs; logically then, how operational art manifests itself will also differ depending on the historical period. The tools available to operational artists are a direct reflection of a society's economy as well as the technology available within that society. The capability of a society's economy is a direct reflection of its stage of economic growth. A society's stage of economic growth and development dictates the tools available to the operational artist. Essentially, the economic development of a nation-state will determine, in large measure, its ability to conduct

operational art. In determining the link between economic growth and operational art, this study uses the five stages of economic growth described in W.W. Rostow's Stages of Economic Growth. These stages are: traditional society, preconditions for take-off, take-off, drive to maturity, and high mass consumption.

The first stage is the traditional society. Traditional society possesses a low ceiling of attainable output per capita because of the backward nature of its technology.[4] In the next stage (preconditions for take-off), a societal group invests and take risks to overcome the structure and values of a traditional, subsistence-based society. This second stage is a transitional period in which a society prepares for sustained growth. When resistance to steady growth is overcome, society enters the third stage, take-off. The critical element in the take-off is the effective introduction of the new technologies in an environment where the spreading effects occur.[5] In regard to the fourth stage Rostow states, 'an economy demonstrates that it has the technological and entrepreneurial skill to produce not everything, but anything it chooses to produce.'[6] In the fifth stage, a nation shifts from basic needs to the production of consumer goods.

The review of each stage of growth will be organized into three sub-sections: theory, history, and analysis. The theory section will establish the setting for the analysis. The historical section will examine criteria relative to the specific stage of growth. For this study three analytical criteria of technology, infrastructure and a society's productive capacity will focus on the use of tools provided by society in each stage of growth. These criteria provide a comprehensive analytical basis for studying the relationship between economic growth and operational art. Then an analysis will determine how the operational commander uses the available tools to translate his vision into military operations to achieve strategic aims. The analysis section also integrates theory and history to establish the link, if any, between economic growth and operational art. The monograph's final portion provides key ideas for the future execution of operational art and appropriate conclusions.

III. Traditional Society

A traditional society is one whose structure exists within limited production functions, based on pre-Newtonian science and technology.[7] At this stage in a society's development, a ceiling exists on the

level of attainable output per capita. Additionally, the social structure is hierarchical and the value system is characterized by long-run fatalism.[9] A society emerges, or transitions, from traditional society as modern science and technology become available, understood, and regularly and systematically applied. This transition takes time and leads to the preconditions for take-off stage.[9] Rostow classifies all traditional societies as the whole pre-Newtonian world.[10] Genghis Khan's Mongol society is representative of Rostow's traditional society.

The Mongols were a conglomeration of tribes inhabiting the slopes of the Altai mountains, northwards to Lake Baikal and south-eastwards into Manchuria. They were generally a nomadic people split into two groups: the sheep-herding pastoralists of the grasslands and the poorer hunting-fishing clans of the forest.[11]

The characteristics of Rostow's traditional society are easily discernible in the Mongol way of life. The Mongol people were nomadic in nature with little or no production functions at all. They relied upon their ability to hunt, fish, and raise livestock, and their need for metals, grain, textiles, and other luxuries led to trade with other societies.[12] The Mongol infrastructure was very crude and mainly consisted of

well worn paths linking the pastures where the tribes grazed their herds of goats and horses or traditional trade routes.

Genghis Khan's Mongol tools of war were rudimentary by any standard. However, the Mongol people easily adapted the tools they used in everyday life for use in war. For example, the bow was the primary weapon used in both hunting and war. The Mongol's also used the horse in hunting and in war. The Mongol horse was a tough and durable animal that did not need fodder because it could live off the grassy plains where the Mongols lived and fought. The Mongol horseman also fought the way they hunted. They would come together and trap their enemy into a small place, where the horsemen would encircle and kill their prey.

The combination of horse and bow made for an effective mobile force against Genghis Khan's enemies. Genghis Khan's vision of military operations was a major factor in building the Mongol empire. His strategy imposed discipline and unity over his warlike followers and injected disarray among his enemies.[13] His use of military operations to unify fragmented tribes into a single organization and increase the size of the Mongol empire is an impressive achievement. Genghis Khan first built a confederation from the Mongol nomad tribes, and next used this confederation to neutralize the threat

from China. He then defeated any resistance from the Turco-Mongol peoples of the steppes, before returning to conquer China.[14]

Genghis Khan used both mobile warfare and siege warfare. He waged mobile warfare in an attempt to defeat some of his enemies through encirclement.[15] He resorted to siege warfare to defeat the walled cities of the Chinese. Genghis Khan also employed terrorism to defeat the morale of his enemy as well as deception, ambushes, and surprise. His operations demanded good communications between units, and Genghis Khan used couriers, drums, and signal flags for communication purposes.[16]

The Mongol victory over Khwarazmsha Ala al Din Muhammad, an emerging Iranian would-be ruler of central Asia, provides an illustrative example of Genghis Khan's visonary use of military operations to achieve political aims. In late 1219 the Mongol army advanced on four fronts against Khwarazmsha. Three armies led by Genghis Khan's sons, and a fourth army led by Genghis Khan himself advanced against Khwarazmsha's forces. Each column proceeded to attack and defeat Khwarazmsha's cities and garrisons in detail throughout the Iranian ruler's empire. Although Khwarazmsha died in December 1220, his forces continued to fight until they were

eventually defeated by a combined Mongol force led by Genghis Khan in November 1221 in a battle near the Indus River.[17]

The impact of Genghis Khan's achievements is truly remarkable. He unified a fragmented society and built a major empire. As both the Mongol political and military leader, Genghis Khan had both political aims and operational vision to achieve those aims. As the political leader, his aim was the unification of the Mongol tribes and expansion of the Mongol empire. He used the tools of his time to translate his vision into military operations to achieve his political aims. Genghis Khan and Mongol warfare represent a form of operational art in a traditional society.

IV. Preconditions for Take-off

During the preconditions for take-off both economic and non-economic changes occur. In the non-economic area, a new leadership must emerge to foster the idea that economic modernization is feasible and possible. This new leadership must overcome the psychological and sociological ties to traditional society in order to push a society into the pre-conditions for take-off.[18] However, Rostow indicates that a rise in nationalism is also a strong non-economic force that pushes a traditional society towards modernization. The

preceding is true, in part, because the traditional society failed or threatened to fail to protect a society from humiliation by foreigners.[19] Rostow cites Commodore Perry's visit to Japan in the 1850's as the event that led to Japan's nationalism and modernization.[20]

In the economic area, the preconditions for take-off are largely a result of an increase of social overhead capital. Increased capital includes a surplus in the agricultural sector that can be used to finance industrial expansion, the exploitation of existing opportunities, and the creation of new opportunities.[21] For these shifts to take place, a rise in the rate of investment must occur. Essential to this growth is a group of people willing to mobilize savings and take risks. In other words, those with money must be willing to invest in new industry for the long term to stimulate the change required for transition.[22]

Rostow identifies two historical cases of preconditions for take-off. The first is the general case in which changes in a well-established traditional society occur. The second is the 'born free' case in which nations emerge as an outgrowth of British colonization. In this instance, Britain was already well established in the transitional process.[23] The United States is an example of a 'born free' economy. The United States never experienced the structure,

politics and values of traditional society, and America's growth was largely economic and technical. The United States had only to build overhead capital (rail, ports and roads) and find an economic setting in which a shift from agriculture and trade to manufacturing was profitable.[24] France under Napoleon provides an example of operational art for a society in the preconditions stage.

During the Napoleonic era, France was in the midst of the preconditions for take-off. France had passed through the traditional society, and French social values, political structure (a centralized nation state), and economic changes had surpassed the conditions of a traditional society. France, theoretically, possessed all of the requirements to transition into take-off. However, while France's leaders worked for economic advancement, they were more concerned with political, social, and religious change, and war in Europe rather than economic revolution.[25] France had long surpassed being a traditional society, and yet she had not advanced into the take-off. Instead, she was somewhere in the preconditions for take-off stage.[26]

Napoleon had numerous tools at his disposal to achieve the strategic aims of France. These tools included artillery, cavalry, infrastructure, and the French people. Napoleon once wrote, 'Great battles are won by artillery.' The aggressive use of artillery was

often the deciding factor in a battle.[27] While Napoleon rarely had a numerical advantage in artillery on the battlefield, he could usually get more of his guns into action than his opponents through his superior command and control system.[28] Napoleon also used his cavalry to great advantage.

Napoleonic France had light, heavy, and dragoon cavalry. The light cavalry was used primarily for reconnaissance and to screen his forces when conducting movements. Napoleon envisioned two uses of the heavy cavalry. First, he used heavy cavalry in the classic cavalry charge to shock and break enemy formations. Secondly, he used the heavy cavalry as a reserve force to counter enemy charges.[29] The dragoons were originally organized as mounted infantrymen. They were extremely flexible and executed many different missions to include serving as infantry, line of communications security, flank-guard, couriers, transport escort, and occasionally as heavy cavalry.[30] Napoleon used cavalry and artillery as both tactical and operational tools. The military was also a reflection of French society in the preconditions stage. For example, cavalry officers were generally chosen from French aristocracy. However, Napoleon's most important military tool was his use of the 'nation in arms.'

An intense national patriotism and political influence of the middle class was born out of the French

Revolution of 1789.[31] This revolution also brought about social, political, and military change. One political innovation that affected the military was a policy that in theory approached universal conscription for military service--the levee en masse or nation in arms.[32] The levee en masse introduced a large number soldiers to the army. This required commanders to organize their forces. Napoleon inherited a system of organization that had originated with Marshal Broglie in 1761.[33] Napoleon improved this system by creating the corps d'armee. Perhaps another reason for the establishment of the corps organization was the need to move large numbers of forces on an undeveloped European infrastructure. The European infrastructure consisted of numerous roads, and were generally not sturdy enough to support the continuous movement of large numbers of men, horses, and wagons. A logical conclusion would be the organization of the army into corps to facilitate movement on an undeveloped European infrastructure.

The composition of the corps included infantry, cavalry, and all requisite supporting services. The use of this corps provided Napoleon a great deal of flexibility. As each corps was a self-contained force, it was capable of successfully engaging a superior force until Napoleon could maneuver the remainder of the army

to the flank or rear of the enemy. A part of Napoleons's theory was to achieve local superiority with an inferior force.[34]

The corps system also enabled Napoleon to maneuver his army on separate routes of advance. This allowed troops to forage for supplies and caused confusion in the mind of the enemy as to the location of Napoleon's main army. Again, the use of the corps system permitted movement of large numbers of troops on an undeveloped European infrastructure. This supported Napoleon's vision of local superiority over his opponent by rapid movement into the flank or rear of the enemy. Occasionally, Napoleon resorted to frontal attack when he perceived a weakness in the enemy disposition.

As with Genghis Khan, Napoleon was both the supreme political and military power. Napoleon always had a fixed strategic aim and a vision for the use of the tools French society provided him. He recognized the full potential for the use of these tools in warfare. His vision for the use of those tools manifest itself in reality in his military operations to achieve strategic aims. The use of his artillery and cavalry were to a lesser extent examples of his vision. However, the use of the corps system in distributed operations to orchestrate a decisive battle to end the war was more

characteristic of not only Napoleonic warfare, but of operational art in a preconditions society.

V. The Take-off

The take-off is a period of decisive transition for a nation in which it attains the achievement of regular growth and the idea of compound interest becomes ingrained into the society's structure.[35] The contrast between the preconditions and the take-off lies in the transformation of traditional attitudes and productive techniques. Economic growth occurs in the preconditions, but in the take-off the traditionalist mentality is overcome and the growth process becomes institutionalized in the society.[36]

The United States was 'born free.' Hence, the development of overhead capital and a shift to manufacturing moved the U.S. into the take-off. Rostow places the U.S. take-off between 1843-1860. He ascertains that this is an upshot of two different periods. The first occurred in the 1840's initiated by rail and manufacturing development in the East. The second take-off occurred when the railway in conjunction with the telegraph expanded into the Middle West in the 1850's initiated by an inflow of foreign capital.[37] However, the South, an agrarian society and more

traditionalist in nature, did not experience take-off during these time periods. Thus America's take-off only occurred in the North and the West during the specified period. The analysis of operational art in the take-off stage will focus on the North and General Ulysses S. Grant and his 1864 campaign during the Civil War.

The take-off of the North directly contributed to the tools used by General Grant in the Civil War. As the country expanded westward and built the railway and water canal system, immigration increased to fill the jobs created. Governmental legislation in the form of the Homestead Act, Land Grant College Act, and Pacific Railway Act also fueled productivity and prosperity. An increase in the birth rate occurred as immigration continued to grow. By 1860 there were 32 million people in the U.S. of which 22 million were living in the North.[38]

The expansion of the telegraph and rail and canal transportation systems created a need for production. This growth in turn enabled further production, and the natural resources led to new levels of manufacturing. The natural resources included water power, river transportation systems, and iron ore form Lake Superior. The ore was then used in foundries to produce cannon, mortars, railroad rails, plating for ironclad ships, and locomotives.[39] This established infrastructure, abundance of resources, strong production base, and

manpower coupled with an organized financial system gave General Grant his operational tools.

The tools available to the North in the Civil War such as its financial system, cannon, mortars, and the mixture may be considered contributing operational tools. However, the two tools that emerged during the North's take-off that changed the characteristic of operational art were the railroad and the telegraph because of the impact on the way the operational artist envisioned war. The railroad sped the movement of troops into a theater of operations, allowed troops to rest while moving from one location to another, simplified logistical problems, enforced a distributed pattern of force deployment, and provided a link between the military front and the rear.[40] The electric telegraph increased the flow of information from commander to commander so armies could operate as a unitary force and enabled news of the war to be transmitted to the home front.[41]

General Grant recognized and understood the utility of the tools he had available. In 1864 Grant envisioned a campaign--not a battle--to defeat the South.[42] He knew he needed a unified campaign throughout the theater of war. Grant wrote, "Before this time, these various armies had acted separately and independently of each other giving the enemy an opportunity often of depleting

one command, not pressed, to reinforce another...I determined to stop this.'[43]

Grant's plan envisioned attacks by Generals' Meade in Virginia, Sherman in Georgia, Banks in New Orleans, Sigel in the Shenandoah Valley, and Butler at the mouth of the James River.[44] The use of rail and telegraph more than any other tool enabled Grant to execute his vision. Rail and telegraph enabled him to move, support, and command his armies. If these tools had not been available then he probably would have had to devise a different type of campaign.[45]

Mr. Jim Schneider, theorist at the School of Advanced Military Studies, provides an excellent study of operational art in this time period. In his work 'Vulcan's Anvil,' he outlines several characteristics of operational art found in Grant's 1864 campaign. This is the first time these characteristics are manifested at the operational level of war. Mr. Schneider defines operational art as the creative use of distributed operations for the purposes of strategy.[46] He further delineates eight necessary and sufficient contextual conditions that must first exist before operational art can flourish and sustain itself. These conditions are:

1. Weapon lethality must have advanced beyond the technological stage of the smoothbore musket.

2. Continuous logistics to support successive movement and sustainment.

3. Instantaneous communications.

4. Operationally durable formations.

5. Operational vision.

6. An operationally minded enemy.

7. The nation must have a distributed capacity to wage war.

8. Continuous mobilization.

Each of these characteristics are seen in Grant's 1864 campaign. However, it is interesting and important to note that only because of the tools he had, such as railroad and telegraph, was Grant able to conduct operations that surfaced Mr. Schneider's eight characteristics. If Grant had not had the railroad and telegraph, he may have expressed his vision of operational art differently. Grant's vision may have been more similar to Napoleonic warfare.

A society in the take-off stage of economic growth and development provides different tools to the operational artist than were provided in a traditional or preconditions society. In the case of the U.S. take-off, the rail and telegraph system allowed General Grant's vision to flourish. He envisioned a series of operations and organized a campaign of distributed operations using five different armies to force the capitulation of the South. During this northern take-off period, General Grant conducted simultaneous and successive operations to defeat his opponent. The search for the decisive battle to achieve victory and

end the war in a take-off society was no longer attainable as it had been during a pre-conditions society. This is primarily due to the introduction of technologically advanced tools provided by a take-off society. These tools proliferated the emergence of Mr. Schneider's characteristics of operational art during this time period.

VI. Drive to Maturity

Following the take-off, a period occurs when a society has effectively applied the range of modern technology to the bulk of its resources.[47] Technology spreads beyond the leading sectors that powered the take-off. In this stage an economy demonstrates that it has the technological and entrepreneurial skills to produce not everything, but anything that it chooses to produce.[48] This development is the drive to maturity.

Societies may enter the drive to maturity at different times. Rostow provides the following symbolic dates for technological maturity:

Great Britain	1850	Sweden	1930
United States	1900	Japan	1940
Germany	1910	Russia	1950
France	1910	Canada	1950[49]

The drive to maturity for the United States, France, and Germany began with the development of industries associated, in part, with the development of railways.

As the rail system developed, so did the incentive to produce good, cheap steel to fuel the railway boom. Once this steel was available, other uses for steel (such as the efficient boiler, the modern steel ship, machine tools, and new equipment for heavy chemical manufacture) came about.[80] Thus, new ships, chemicals, electricity, and products of the machine tool came to dominate the economy and sustain the overall growth rate.[81]

Germany began the drive to maturity around 1910. At the beginning of World War II, Germany was in the drive to maturity. Hitler's rise to power propelled Germany into an era of military expansion. Economic growth and development in Germany was secondary to rearmament. Hence, resources for normal economic growth and development were diverted from attaining the stage of high mass consumption and Germany temporarily stagnated in the drive to maturity.

Operational art in the drive to maturity stage in Germany was similar to General Grant's operations in the Civil War. The characteristics of operational art as outlined by Mr. Schneider are found in operational art during World War II. General Eric von Manstein and the operations of Army Group Don on the Russian Front in 1942-43 provide a good case study of operational art during the drive to maturity stage. Manstein is but one

example of a military artist's expression of operational art during a societies drive to maturity.

Many of the tools in WW II were different than the tools available in the American Civil War. Manstein had a wider variety of technologically advanced tools with which to conduct operational art. The airplane, tank, machinegun, wireless communications, improved road networks, and motorization are just a few. The infrastructure Manstein operated on was similar to both Napoleon and Grant. Manstein had some rail and road networks to support his operations, but he also had motorization which enabled him to move, to a limited degree, away from the established infrastructure. More important than a list of the tools available to Manstein, are the similarities in the expression of operational art practiced in societies in a take-off and drive to maturity stage of economic growth and development. Schneider's eight characteristics of operational art found in Grant's campaigns are also found in Manstein's campaigns against the Russians.

Weapons lethality was certainly greater than the smooth bore musket in both the Civil War and WW II. Manstein's motorized and armor units required continuous resupply to sustain and maintain their operations lest they experience culmination.[82] This is due in part to the vast distances these units operated across and to the large amount of munitions and petrol required to

execute their operations. The radio was a quantum improvement over the telegraph and provided the necessary instantaneous communications required to synchronize the maneuver of large formations spread out over great distances. Just as Grant used the steady supply of soldiers from his society and synchronized the efforts of five armies in his 1864 campaign, so did Mainstein. The German nation demonstrated the capacity to provide soldiers and to wage war simultaneously on multiple fronts. Thus, the conditions of continuous mobilization and the nations distributed capacity to wage war were fulfilled. Finally, Manstein demonstrated operational vision in his achievements against the Russians.

Manstein knew the importance of maintaining the integrity of the southern flank of the German Army. If Russians defeated the German forces in the south, then the central and northern fronts would also be in danger of being lost. Thus, his strategic aim was to maintain the integrity of the southern flank.[53] Manstein blocked four Russian offensive efforts in the winter of 1942-43 and conducted a counteroffensive to recapture Kharkov and a line along the Donets River.[54] These campaigns happened at a time when the German 6th Army had been trapped and defeated in Stalingrad. Manstein envisioned a series of operations organized into a campaign of distributed operations to achieve his strategic aim.

The similarities in operational art practiced by Grant and Manstein appear to mirror each other. However, there is some indication of a qualitative difference between the two operational artists and their societal stage of growth. Prior to the take-off stage the tools of the artist did not generally change very rapidly. The operational artist could assimilate the changes associated with economic growth and development more slowly. However, once a society enters the take-off and subsequent drive to maturity stage, change occurs more rapidly. The operational artist had to accelerate his visionary process to keep up with the changes.

As a society develops economically, a secondary, concurrent and parallel growth also occurs. The economic growth and development that provides the physical tools to the operational commander also fosters a societal maturation process. The maturation process is a process whereby the people of a society learn to accept, adapt, and use the physical changes that emerge from economic growth and development. The artist must also mature so that he can envision the use of the tools from his society's economic growth. Recall how the birth of railroad led the U.S. into a take-off society and promulgated new technology that spread to other sectors of the society. A similar process occurs in the societal maturation process.

Literacy increases as workers are trained to meet the demands of new production technology. Expectations and standards of living increase. The desire of the people to excel and succeed increase. The process becomes cyclical and advances to the next higher plane of maturation as growth and development advance. The operational artist becomes a product of the maturation process. Societal norms, tradition, education, experience, and cultural bias are just some of the things that enable the operational commander to mature. If the operational artist fails to or is prevented from experiencing this maturation process, than operational art may not experience full growth.

Operational art practiced by societies in the take-off and in a drive to maturity stage are similar. Schneider's characteristics of operational art readily illustrates these similarities. The sequential campaign is a common theme throughout both the take-off and drive to maturity stages. However, just as a change in operational art occurs between preconditions society and a take-off society, a change in operational art between take-off and drive to maturity societies also occurs. Certainly, the advancement of technology and the introduction of new tools such as the airplane and tank is part of the change. However, the maturation process is an important qualitative change that also occurs. Here, the operational artist gains a true understanding

and appreciation for the tools of his society. There is no clear distinction of a point in time where this change occurs. Instead, there is a continuous process that overlaps as economic growth and development occurs.

VI. High Mass Consumption

The age of high mass consumption is a shift towards durable consumer goods and services.[55] Societal attention shifts from supply to demand. In this stage Rostow cites three major objectives that compete for resources and political support. First, the nation can pursue external power and influence. Second, the resources can be used to foster a welfare state or a distribution of income through progressive taxation, to achieve human and social objectives. Third, is the expansion of consumption levels beyond basic food, shelter, and clothing.[56] In the end, Rostow proposes that each society chooses a balance among the three choices.

The United States was the first society to transition into the age of high mass consumption. This move occurred in four phases: the progressive period, the 1920's, the great depression of the 1930's, and the post-war boom of 1946-56. During the progressive period, the U.S. experienced a change in the thought

pattern of national policy. The direction of policy leaned towards the U.S. moving out from the confines of the Monroe Doctrine and the protective umbrella of Great Britain. The U.S. was on the road to becoming a mature world power. However, resources were not yet allocated for this to become a reality.

During the 1920s a new middle class appeared in American society. A 1000 fold increase in the production of the automobile occurred. Semi-skilled workers entered the work force and the cities and suburbs became the focal point of living areas. With these new living areas, came the production of radios, refrigerators, and other consumer products. However, the depression of 1929 temporarily stymied this age of high mass consumption. As the demand for automobiles, homes, and other durable goods diminished, the welfare alternative surfaced to fill the void. Finally, the post-war boom of 1946-56 was regarded as a resumption of the boom of the 1920s. Rostow does not provide any facts on economic growth and development in America after 1956.[87] However, this post-war high mass consumption boom did not end in 1956. The demand for durable goods in American society is still prevalent today.

Operational art during the age of high mass consumption assumes the characteristics of both the take-off and drive to maturity stages. Yet, there is

something that is different about the expression of operational art that indicates some shift has occurred. General Norman Schwarzkopf and Operation Desert Storm illustrate operational art as practiced in a high mass consumption society.

A major factor in the development of the tools available to General Schwarzkopf lies in the search by the U.S. defense establishment for means to offset the military numerical advantage of the Soviet Union. These developments enabled the United States to enjoy perhaps a five year lead over the Soviet Union in electronics for military weapons and communication. As of 1989 the U.S. Department of Defense spent roughly fifty percent of its budget on electronics for military weapons and communications.[88]

The military had invested in solid-state electronics since the earliest day of the transistor. As technology evolved, the U.S. Department of Defense naturally followed suit. Calculators, video games, cameras, automobiles, personal computers, watches, and home appliances are just a few of the consumer uses of microelectronics.[89] Many of the weapons systems used in Operation Desert Storm employed the same technology. The media touted the armed forces in the desert as a 'high tech' force. Smart munitions, global positioning devices, satellites, the stealth fighter, the Apache helicopter, and M1 Abrams tank are just a few of the

technologically advanced weapon systems General Schwarzkopf had available for use against the Iraqi forces. However, one tool that is markedly different than the normal grouping of weapon systems is public information.

Media were also used in Desert Storm as an operational tool. Instantaneous communications not only kept the American public and the world informed, but it also provided General Schwarzkopf a tool to link Allied political aims to tactical actions on the battlefield. For example, the Iraqi commanders were sure the U.S. Marine Corps would conduct an amphibious assault into Kuwait. Media helped transmit this intent to the Iraqi commanders. Thus, the Iraqi commanders allocated a large number of forces to defend the coast when these troops could have been better used elsewhere. In Desert Storm, perhaps for the first time, media became a tool used by the artist that contributed to the expression of operational art.

The chance to use the tools as envisioned by General Schwarzkopf was enhanced by the ability to get the tools into the theater of operations. The infrastructure in the Middle East was both good and bad. The ports and airfields were well developed and enabled large numbers of planes and ships to offload their cargos. On the other hand, there was no highly developed road or rail network established in the theater of operations.

However, in most cases the type and quality of the equipment used by the Allied coalition was able to overcome this lack of infrastructure and accomplish the mission.

The American societal maturation process also kept pace with economic growth. The servicemen operating the equipment were well educated and highly trained volunteers. All of these tools certainly affected Schwartzkopf's vision of operations to eject Iraqi forces from Kuwait.

Once again the applicability of Schneider's eight characteristics are seen in Operation Desert Storm. However, a new phenomenon occurred at the operational level that had not been seen before--simultaneity. General Schwarzkopf had the tools to attack simultaneously, execute control in real time at all echelons, synchronize battles, and control the tempo of the fight.

The notion of close, deep, and rear almost became one as the ability to attack anywhere on the battlefield became reality. The sequencing of operations was still important. Certainly, sequencing of combat forces and sustainment occurred. Additionally, the air campaign was sequenced to set the conditions for success. However, the length of time for each sequence decreased. Interesting to note is the presence of these same characteristics in Operation Just Cause in Panama. While this is largely a question of scope, a change in operational art began to emerge in December, 1989.

Sequencing of operations in Desert Storm no longer resembled the campaigns of WW II or Korea. The weapons systems available to the commander enabled him to decrease the length of the campaign through synchronization of effort by attacking simultaneously across the battlefield. Operation Desert Storm appears to have had the characteristics of the search for the decisive battle as well as the search for the decisive campaign. There is not enough evidence to support either postulation. However, there is something qualitatively different, a change in operational art that occurred to some degree in Just Cause but really came to the surface during Operation Desert Storm. The exact nature and extent of that change is difficult to determine at this time. However, the one thing that has become apparent is the ability to expand the battlefield in time and space by conducting parallel, concurrent, and simultaneous operations. This same phenomenon also tends to blur the distinction between the traditional close, deep, and rear operations concept into one operation.

VII. The Future

As economic growth and development of a society continues to evolve so will the vision of the operational artist. The ability to accurately predict

what operational art will look like in the future is uncertain at best, but there are known factors that will affect the operational artist.

As the American military establishment decreases in size and continental basing of forces becomes a reality, force projection will become increasingly important. Lethality and precision of weapons will extend the range of direct and indirect fires. In turn, operations may have a higher tempo and battles may finish more rapidly. Improved intelligence should increase the ability to deal a "knock-out blow" to the enemy. Enhanced command and control assets will continue to improve synchronization and decrease reaction time. The proliferation of weapons of mass destruction will limit the ability to concentrate force and press for geographic expansion. Finally, media will continue to be a major tool in the hands of the operational commander to link political and tactical echelons.

Several battlefield implications result from these factors. First, there is a greater urgency in early entry, lethality and survivability. Secondly, simultaneous attack becomes more important as the close, deep, and rear notions of the battlefield become increasingly blurred or extinct. Hand in hand with the blurred battlefield is the evolving notion that battlefield space will continue to expand as newer weapons are introduced. Thirdly, the enhancement of

cybernetic technology to command and control the tempo of operations will expand vertically and laterally to all levels. Finally, sustainment will be tailored for specific operations. Extended time to sequence sustainment packages will no longer be available. Sustainment must flow simultaneously with the combat forces. Operational art in the future will be compressed in time and the increased lethality of weapons will cause the battlefield space to become blurred.[80]

American society appears to be experiencing the growth pains of transition into a post high mass consumption society. The ability to produce almost anything society demands or desires is reality. The impact and possible uses of the new tools will be endless. For example, there may no longer be a need for an established infrastructure when envisioning military operations. Helicopters, air cushioned vehicles, and newer lighter combat vehicles are just a few of the realities that even today limit the need for a perfect infrastructure.

Conclusions and Implications

The use of historical examples for analysis is dangerous. Distortion of the truth can result from looking at only one example through a telescope.

However, the historical examples used in this study collectively indicate that operational art manifests itself differently in time as a function of the tools and technology available. The artist, sculptor, and composer use different tools to create their works of art; likewise the operational artist creates operational art by using the tools he has available. The society provides those tools to the operational artist based on the current stage of economic growth and development.

The vision of the operational artist is a very important part of operational art no matter what stage of growth a nation is experiencing. The tools in Napoleonic warfare were certainly available to all the commanders of the time. Yet, only Napoleon recognized the potential of their use. This vision of the commander does not suddenly appear as some magic solution. Vision is a result of many things to include knowledge, experience, social norms, traditions, culture, and an understanding of the military tools available in society.

The operational artist must also avoid over generalization. Societies in the same stage of growth may not have the same tools. Each society develops at its own rate given its own set of unique circumstances. Concurrent with this line of thought is the recognition that societies in different stages of growth may oppose

one another in war. The take-off society of the North fighting the traditional society of the South in the American Civil War is one example. This does not mean that the more advanced society in terms of the economic stages will always triumph. However, given the known stage of economic growth, the operational artist should gain some knowledge of the capability of the enemy. Therefore, an awareness of the enemies stage of economic growth will assist the operational artist in the creation of his vision. The question then arises about the society that skips stages of growth by purchasing its war tools from an economically advanced society.

Iraq is an example of this type of society. Iraq, through the sale of oil, was able to purchase tools of war from a more economically and technologically advanced society. However, Iraq could not compete with the Allied coalition confronting them in January 1991. This seems to imply that simple possession of the tools of an advanced society does not enable a lesser developed economic society to execute the operational art associated with those tools. A logical conclusion follows that there must be a corresponding maturation of the society as a whole for the operational artist to use the tools of a more advanced society. For example, if the war tools of the U.S. were suddenly imposed on an underdeveloped third world nation, they probably could not operate the equipment much less have a vision for

its use in military operations. The society must increase its knowledge and advance socially, politically, and economically to be able practice operational art with the tools from another society.

Mr. Schneider's 'Vulcan's Anvil' provides an excellent analysis of operational art during the Civil War. There is certainly a distinct change in the look of operational art during the Civil War. Prior to the Industrial Revolution, which happened to coincide closely with the take-off stage, the tools available to the operational artist were limited. Thus, in turn so were the available options for achieving strategic aims. That not withstanding, those operational artists whose societies did not enter into the take-off stage used the tools available to achieve strategic aims. Schneider's characteristics of operational art began with General Grant's 1864 campaign and were certainly evident in the victory during Operation Desert Storm.

Technologically advanced societies in the age of post high mass consumption have the capability to conduct simultaneous, concurrent, and parallel operations. The use of the tools available to the operational artist are limited only by his vision. Sea launched missiles can attack targets hundreds of miles inland. Computer viruses can be transmitted to enemy weapons and defense systems rendering them useless. Industry can produce virtually anything it desires.

The debate over the birth and definition of operational art will continue. However, any attempt to place specific characteristics on operational art in a general context may prove harmful to understanding the essence of the link between strategy and tactics. The expression of operational art varies. Just because people do not recognize the link between strategic aims and military operations to achieve those aims, does not mean that operational art never existed. Perhaps Jim Schneider is correct in that the fullest expression of operational art did not appear until 1864. However, this does not mean operational art did not exist before 1864.

Before explorers sailed around the world, many people believed the world was flat. Did that make the world any less round? To place labels on operational art could have the same effect as the flat world syndrome and stifle the search for operational art in the future. There is a link between Rostow's stages of growth and operational art. Economic growth and development is a direct influence on the tools available to the operational artist and fosters a societal maturation process that enables the artist to flourish. We in the armed forces of the U.S. cannot afford to be wrong. We must constantly search for the changing realities of operational art. This paper is not the answer to operational art. Instead it is simply an

alternative to aid others in seeking their own understanding of operational art.

War will become more complex as societies continue to develop and grow. These societies will enter Rostow's advanced stages of drive to maturity and the age of high mass consumption. Nation-states will eventually gain access to technologically advanced tools and mature in such a way that will enable them to effectively use those tools in war. This is especially important to the Army because historically it must ultimately secure the victory by putting its soldiers on the ground in the face of the enemy.[81]

The study and development for the most correct doctrine possible is of paramount importance if we are to safeguard our soldiers lives in the attainment of strategic goals through the use of military force. The ever evolving nature of economic growth and development is complex. Economic change will continue throughout the world and the stages of growth provides a model for doctrinal analysis to help keep doctrine from being too far wrong.

ENDNOTES

[1]Earle, Edward Mead. "Adam Smith, Alexander Hamilton, Friedrich List: The Economic foundations of Military Power." Makers of Modern Strategy. Peter Paret, Ed. Princeton: University Press, 1986, p. 218.

[2]Schneider, James J. "Vulcan's Anvil: The American Civil War and the Emergence of Operational Art." School of Advanced Military Studies, Fort Leavenworth, Kansas, June 16, 1991, p.64.
The Soviets express operational art as the theory and practice of preparing and conducting operations by large formations. Reznichenko, Vasiliy G. and Vorobyev, Ivan N. and Miroschinchenko, Nickolay F., Taktika. Published under the auspices of the US Air Force, June 29, 1988.
US Army FM 100-5, Operations. Washington DC: May, 1986.

[3]Lott, MAJ Cecil L. School of Advanced Military Studies, Fort Leavenworth, Kansas, Spring. 1992. This definition is a combination of thoughts derived from Mr. James Schneider, theorist at the School of Advanced Military Studies, LTC(P) James M. Dubik, and the students of Seminar 1, School of Advanced Military Studies.

[4]Baldwin, Robert E. Economic Development and Growth. New York: John Wiley and Sons, Inc., 1972. p.77.

[5]Rostow, W.W. The Stages of Economic Growth: A Non-Communist Manifesto. 3rd ed. Cambridge: University Press, 1990, p. 223.

[6]Baldwin. p. 78.

[7]Rostow. p. 4.

[8]Baldwin. p. 77.

[9]Rostow. p. 5.

[10]Rostow. p. 5.

[11]Nicolle, David. The Mongol Warlords. United Kingdom: Firebird Books, 1990, p. 10.

[12]Nicolle. p. 11.

[13]Nicolle. p. 33.

[14]Nicolle. p. 33.

[15]Nicolle. p. 32.

[16]Livesey, Anthony. Great Commanders and Their Battles. New York: Macmillan Publishing Company, 1987, pp. 31-34.

[17]Nicolle. pp. 40-44.

[18]Rostow. p. 26.

[19]Rostow. p. 27.

[20]Rostow. p. 27.

[21]Baldwin. p. 77.

[22]Rostow. p. 20.

[23]Rostow. p. 17.

[24]Rostow. pp. 17-18.

[25]Rostow. p. 33.

[26]Rostow. p. 38. Rostow sets France's take-of at 1830.

[27]Haythornthwaite, Philip J. Napoleon's Military Machine. New York: Hippocrene Books, Inc., 1988. p. 44.

[28]Epstein, Robert M. 'Patterns of Change and Continuity in Nineteenth Century Warfare.' School of Advanced Military Studies, Fort Leavenworth, Kansas, undated.

[29]Haythornthwaite. p. 90.

[30]Haythornthwaite. pp. 62-63.

[31]Clough, Shepard Bancroft. France: A History of National Economics, 1789-1939. New York: Charles Scribner's Sons, 1939, p. 32.

[32]Paret, Peter. ed Makers of Modern Strategy from Machiavelli to the Nuclear Age. Princeton: University Press, 1986.

[33]Haythornthwaite. p. 14.

[34]Haythornthwaite. p. 82.

[35]Rostow. p. 36.

[36]Baldwin. p. 77.

[37]Rostow. p. 38.

[38]Townsend, COL J.W. 'Bones Behind the Blood: Economic Foundations of Grant's Final Campaign.' School of Advanced Military Studies, Fort Leavenworth, Kansas, January 8, 1992, p. 11. Original source by McPherson, Battle Cry of Freedom, p. 193.

[39]Townsend. P. 12.

[40]Schneider, James J. 'Vulcan's Anvil: The American Civil War and the Emergence of Operational Art.' School of Advanced Military Studies, Fort Leavenworth, Kansas, June 16, 1991, pp. 36-37.

[41]Schneider. p. 37.

[42]Dubik, LTC(P) James M. 'Grant's Final Campaign: A Study of Operational Art.' School of Advanced Military Studies, Fort Leavenworth, Kansas, 1991, p. 9.

[43]Dubik. p. 9. Originally found in Ulysses S. Grant, Personal Memoirs of U.S. Grant, E.B. Long, ed. New York: Da Capo Press, Inc., 1982, p. 364.

[44]Dubik. p. 14.

[45]Dubik. p. 26.

[46]Schneider. p. 64.

[47]Rostow. p. 59.

[48]Rostow. p. 10.

[49]Rostow. p. 59.

[50]Rostow. p. 61.

[51]Rostow. p. 59.

[52]US Army. FM 100-5, Operations: Washington DC: Department of the Army, May, 1986, p. 81. Culmination or culminating point is the point where the strength of the attacker no longer significantly exceeds that of the defender, and beyond which continued offensive operations therefore risk overextension, counterattack, and defeat.

[53]Sadarananda, Dana V. Beyond Stalingrad: Manstein and the Operations of Army Group Don. New York: Praeger, 1990, p. 151.

[54]Sadarananda. p. x.

[55]Rostow. p. 10.

[56]Rostow. pp. 73-74.

[57]Rostow. p. 199. Here Rostow alludes that the US has entered and is still in the age of high mass consumption.

[58]Powell, R. A. 'Microelectronics.' Windows on a New World: The Third Industrial Revolution. Joseph Finkelstein, ed. New York: Greenwood Press, 1989, p. 19.

[58]Finkelstein, pp. 19-20.

[59]The information in this section is in part a combination of ideas extracted from two briefings presented at the School of Advanced Military Studies, Fort Leavenworth, Kansas.

1. Clark, MG Wesley K., Training and Doctrine Command, Deputy Chief of Staff for Concepts, Doctrine, and Developments. 'New Battlefield Dynamics.' March, 1992.

2. McDonough, COL James R. 'The Changing Nature of War.' Winter, 1992.

[60]Newell, LTC Clayton R. 'Balancing the Ends, Ways, and Means.' Army. August, 1986, p. 32.

BIBLIOGRAPHY

BOOKS

Baldwin, Robert E., Economic Development and Growth, 2nd ed. New York: John Wiley and Sons, Inc., 1972.

Barbera, Henry, Rich Nations and Poor in Peace and War. Lexinton, Massachusetts: Lexington Books, 1973.

Clough, Shepard Bancroft, France: A History of National Economics, 1789-1939. New York: Charles Scribner's Sons, 1939.

Dupuy, Trevor Nevitt (Col., US Army Ret), The Military Life of Gehghis, Khan of Khans. New York: Franklin Watts, Inc., 1969.

Finkelstein, Joseph, Window on a New World, The Third Industrial Revolution. New YorK: Greenwood Press, 1989.

Haythornthwaite, Philip J., Napoleon's Military Machine. New York: Hippocrene Books Inc., 1988.

Herold, J. Christopher, The Age of Napoleon. New York: American Heritage Publishing Co., 1963.

Lauterbach, Albert T., Economics in Uniform. Princeton: University Press, 1943.

Livsey, Anthony, Great Commanders and Their Battles. New York: Macmillan Publishing Company, 1987.

Nicolle, David, The Mongol Warlords. United Kingdom: Firebird Books, 1990.

Paret, Peter, ed. Makers of Modern Strategy from Machiavelli to the Nuclear Age. Princeton: University Press, 1986.

Piekalkiewicz, Jan, Operation Citadel. Novato, California: Presidio Press, 1987.

Rostow, W. W., How It All Began, Origins of the Modern Economy. New York: McGraw-Hill Book Company, 1975.

Rostow, W. W., The Stages of Economic Growth, A Non-Communist Manifesto, 3rd ed. Cambridge: Cambridge University Press, 1990.

Spanier, John, Games Nations Play, 5th ed. New York: Holt, Rinehart and Winston, 1984

Sadarananda, Dana V., Beyond Stalingrad, Manstein and the Operations of Army Group Don. New York: Praeger, 1990.

Van Creveld, Martin, The Transformation of War. New York: The Free Press, 1991.

Van Creveld, Martin, Technology and War. New York: The Free Press, 1989.

MANUALS

US Army 100-5, Operations: Washington DC: Department of the Army, May, 1986.

ARTICLES

D'amura, Ronald M. "Campaigns: The Essence of Operational Warfare." Parameters, Summer, 1987

Earle, Edward Mead. "The New Mercantilism." Political Science Quarterly 40, 1925.

Jablonsky, David. "Strategy and the Operational Level of War: Part II." Parameters, Summer, 1987.

Newell, LTC, Clayton R. "Balancing the Ends, Ways, and Means." Army Magazine, August, 1986.

UNPUBLISHED SOURCES

Clark, MG Wesley K. "New Battlefield Dynamics." Briefing presented to the School of Advanced Military Studies, Fort Leavenworth, Kansas, from TRADOC Deputy Chief of Staff for Concepts, Doctrine, and Developments, February 1992.

Dubik, LTC(P) James M. "Grant's Final Campaign: A Study of Operational Art." School of Advanced Military Studies, Fort Leavenworth, Kansas, undated.

Epstein, Robert, M. "Eagles Triumphant, Napoleon and Eugene in the War of 1809." School of Advanced Military Studies, Fort Leavenworth, Kansas, October 2, 1991.

Epstein, Robert, M. "Patterns of Change and Continuity in Nineteenth Century Warfare." School of Advanced Military Studies, Fort Leavenworth, Kansas, undated.

McDonough, COL James R. "Changing Nature of War." Briefing presented to the School of Advanced Military Studies, Fort Leavenworth, Kansas, Winter, 1992.

Schneider, James J. "Theoretical Paper NO. 3: The Theory of Operational Art." School of Advanced Military Studies, Fort Leavenworth, Kansas, March 1, 1988.

Schneider, James J. "Vulcan's Anvil: The American Civil War and the Emergence of Operational Art." School of Advanced Military Studies, Fort Leavenworth, Kansas, June 16, 1991.

Townsend, COL J.W. "Bones Behind the Blood: Economic Foundations of Grant's Final Campaign." School of Advanced Military Studies, Fort Leavenworth, Kansas, January 8, 1992.

Toynbee, Arnold. "Lectures on the Industrial Revolution of the Eighteenth Century in England." Longmans, Green and Co. 1919.